TiM55x
TiM56x

Ranging Laser Scanner
Short Range

SICK
Sensor Intelligence.

Correct use

The TiM55x/TiM56x laser scanner (referred to as the TiM below) is intended for use as a non-contact measurement sensor in standalone operation. It measures radial distances within a flat surface (circle segment) depending on reflectivity. The TiM displays the measured values of the recorded environment contour of its scanning angle of 270° over the Ethernet or USB interface for further processing as either a one-off or continuously on request. This requires a corresponding driver to be created by the user.
The device is designed for portable or stationary use indoors or outdoors in standalone operation, with a scanning range of up to 10 m.

The purpose of this instruction manual is to allow you to put the TiM into operation quickly and easily and to achieve the first measured value outputs and the first detection results.

Further information on the mechanical and electrical installation as well as on the measured value output is available in the 🕮 *Technical Information* (Nr. 8015883). This information is available for download on the TiM product page *(www.mysick.com/en/tim5xx)*.

Safety information

- Read these instructions before commissioning the TiM in order to familiarize yourself with the device and its functions.
- The TiM corresponds to laser class 1 (➜ see *"Laser beam Page 3"*).
- Mounting and electrical installation are to be performed only by qualified technicians.
- Electrical connections between the TiM and other devices may only be created or fixed when there is no power to the system. Otherwise, the devices may be damaged.
- Conducting cross sections of the supply cable from the customer's power system should be designed in accordance with the applicable standards. Secure the TiM with an external 0.8 A slow-blow fuse at the start of the supply cable, from the perspective of the supply voltage.
- All electrical circuits connected to the TiM must be implemented as SELV electrical circuits (SELV = **S**afety **E**xtra **L**ow **V**oltage).
- Use the device only under permitted environmental conditions (e.g. temperature, grounding potential, ➜ see *"Technical data Page 3"*).
- Turn the swivel connector unit with the electrical connections max 180° from end position to end position.
- Protect the TiM against moisture and dust when the cover to the USB socket is open. The black plastic cover must be screwed flush in order to comply with enclosure rating IP 67 in operation.
- Opening the screws of the TiM housing will invalidate any warranty claims against SICK AG.
- The TiM does not constitute personal protection equipment in accordance with the respective applicable safety standards for machines.

Commissioning and configuration

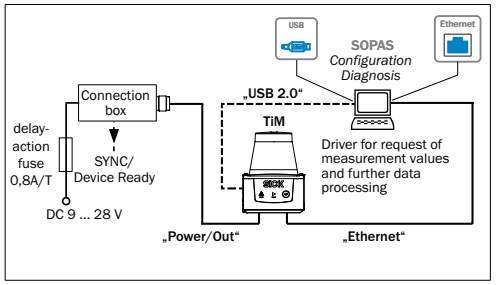
Step 1: Electrical installation

1. Connect the communication interface of the TiM to the PC (Ethernet or USB; recommended Ethernet, 4-pin M12 outlet).

➢ If using a USB, connect the TiM's Micro USB port (behind the black plastic cover on the side) to a free USB port (type A) on the PC using a suitable shielded high-speed USB cable (e.g. no. 6036106, 2 m).
The USB cable may not exceed 3 m in length!
When operating the USB interface, ESD/EMC interferences can lead to an interruption of the USB connection. To continue with the data transfer, disconnect the USB cable from the TiMand reattach it to establish contact. To re-establish communication between TiM and PC in the SOPAS communication software, select COMMUNICATION > GO ONLINE .

2. Turn on and start the PC.
Provide power to the TiM (5-pin M12 plug).
Using the power supply unit it must be ensured that the supply voltage does not drop below 8 V for longer than 2 ms and never rises above 30 V.

Following successful initialization, the green LED lights up "▶" (device ready for operation).



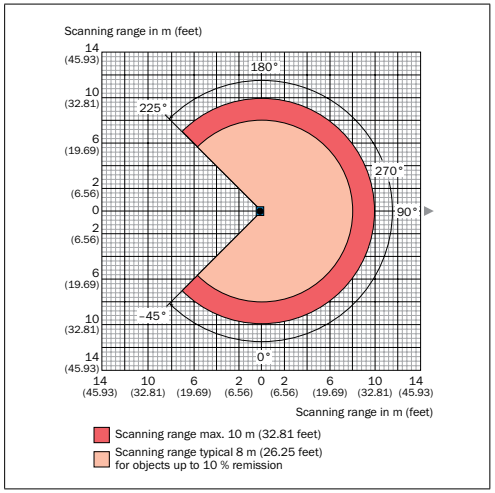
Measurement mode: Electrical block diagram for commissioning

Step 2: Mounting and alignment

NOTE

During installation make sure there is no reflective surface behind the reference target➜ see *"Device overview Page 3", point ⑬.*

1. Optional: mount the TiM to separately ordered mounting accessories (mounting kit 2), see "Mounting" Chapter in the 🕮 *Technical Information* (Nr. 8015883).
2. Otherwise, mount the two straight plates from the enclosed mounting kit 1 on the TiM using two M3 screws. Use the two blind-hole threads either on the underside or back of the housing (➜ see *"Device overview Page 3"*). If the straight plates are not used, screw the screws provided by the customer max. 2.8 mm into the thread.
3. Mount the TiM on a prepared bracket.
The device should be as free from shock and vibration as possible during operation (e.g. using vibration dampers).
4. Align the 90° axis of the TiM's scanning angle with the center of the area to be monitored. The ▶ marking on the lid of the optical hood serves as a bearing alignment aid (➜ see *"Device overview Page 3", point ⑭*).



Range diagram for TiM

Step 3: Commissioning/Configuration

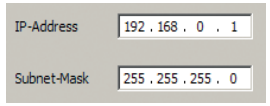
a. Installing and launching the SOPAS configuration software

The SOPAS configuration software is used as standard to display the surrounding contour (measuring line) recorded by the TiM, as well as diagnostic information in the event of an error.

1. Download and install on the PC the software from the website *"www.mysick.com/en/SOPAS_ET"*, software type SOPAS ET. In this case, select the "Complete" option as selected by the installation wizard. Administrator rights may be required on the PC to install the software.
2. Start the "**SOPAS**" program option after completing the installation.
Path: Start > Programs > SICK > SOPAS Engineering Tool > SOPAS.
3. Establish communication between SOPAS and TiM via the wizard that has started automatically: Select CONNECT TO A NEW DEVICE.

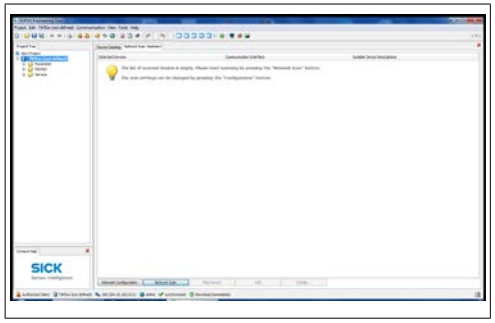
4. Follow the steps in the Connection Wizard until the FOUND DEVICES window.
5. Select the appropriate TiM from the list of available devices:

- Use TiM on port 2111 to configure the device.
- Use TiM on port 2112 to view only measurement data.
  Default IP address of the TiM:



6. Assign the required IP address/subnet mask to the TiM via AUTOMATICALLY or MANUALLY. The IP address/subnet mask should correspond to the address space of the later application.
7. Click FINISH to quit the Connection Wizard.
   SOPAS ET establishes communication with the TiM, loads its current device description (parameters), and displays it in the navigation tree.

SOPAS ET program window for TiM



Navigation tree (left) and respective device pages (right)

b. Output of measured values

If the TiM receives one of the two following commands by telegram over the Ethernet or USB interface it will start the output of measured values in real time over these data interfaces.

The detailed construction of the output telegram as well as the flow of requests and outputs is described in the "*Measured value output*" in the 🕮 *Technical Information* (Nr. 8015883).

One-off output of measured values:

Telegram layout: **sRN LMDscandata**

Telegram part	Description	Variable type	Length (byte)	Value range
Command type	Request (SOPAS read by name)	string	3	**sRN**
Command	Request data	string	11	**LMDscandata**

Example:

Telegramm type	Command
ASCII	<STX>sRN{SPC}LMDscandata<ETX>
HEX	02 73 52 4E 20 4C 4D 44 73 63 61 6E 64 61 74 61 03
Binary	02 02 02 02 00 00 00 0F 73 52 4E 20 4C 4D 44 73 63 61 6E 64 61 74 61 05

Continuous output of measured values:

Telegram structure: **sEN LMDscandata** measurement start/stop

Telegram part	Description	Variable type	Length (byte)	Value range
Command type	Request (SOPAS event by name)	string	3	**sEN**
Command	Request data	string	11	**LMDscandata**
StartStop measurement		Enum8	1	0 Stop measured value output 1 Start measured value output

Example:

Telegramm type	Command
ASCII	<STX>sRN{SPC}LMDscandata<ETX>
HEX	02 73 52 4E 20 4C 4D 44 73 63 61 6E 64 61 74 61 03
Binary	02 02 02 02 00 00 00 11 73 52 4E 20 4C 4D 44 73 63 61 6E 64 61 74 61 05

Activate the output of the measured values in SOPAS on a trial basis:

1. Start the terminal emulator with the button.
2. Select the CONNECT... command in the CONNECTIONS menu in the dialog window and establish communication with the TiM over the Ethernet or USB interface.
3. Enter one of the two telegrams in the "Send telegram" input line as they appear (automatically framed by STX and ETX when sending in the default setting). Pay attention to blank characters in the string.
4. Use the button to transfer the telegram to the TiM. The TiM responds by providing the data as a one-off or continuously in the display area of the terminal emulator.

Data output format of the measured values

The data output format per scan is comprised of the measured values (radial distance, RSSI), device and status information and time stamp.

In the default settings, the distance is output as a measured value (in mm).

In order to output remission values in the telegram, select the RSSI checkbox.

To display the remission values in the scan as well, select the RSSI... checkbox.

Output range of the measured values

The TiM scans an angle range of 270° (-45° to 225°) and outputs 271 measured values per scan in the default setting. The angle range for which measured values can be output can be set via OUTPUT RANGE (TiM55x: resolution 1°, TiM56x: resolution 0.33°).

Some other useful functions

- button: Display the fields in the polar coordinate system
- button: Change the view of the TiM from above (TiM: black) to the view from below (TiM: blue)
- or button: Switch off the display the full measuring line or display a dotted measuring line.

Completing the configuration

➢ Permanently save the entire configuration:
Parameter set in: TiM click the button
Configuration file on the PC: click the button.

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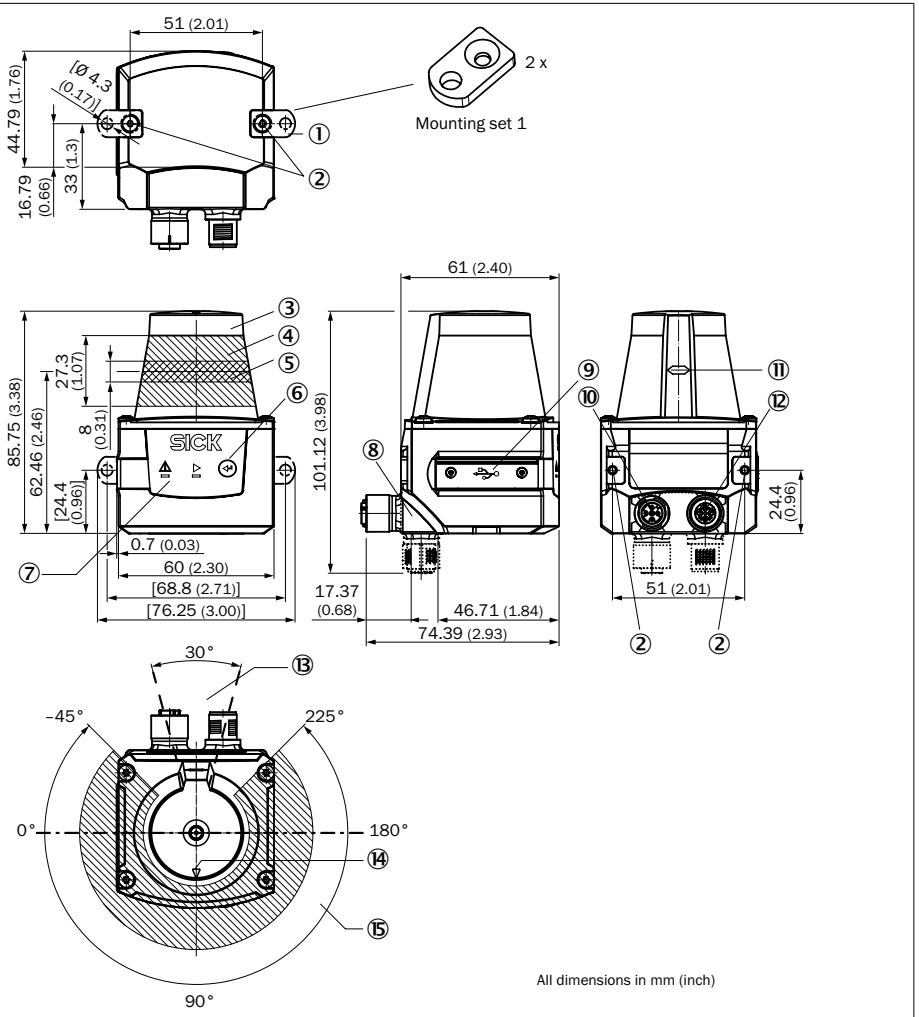
Description of the device

Device overview



① 2 x straight plates with M3 x 4 mm screw (included in delivery)
② M3 threaded mounting hole, 2.8 mm deep (blind hole thread)
③ Optical hood
④ Receiving range (light inlet)
⑤ Transmission range (light emission)
⑥ Push-button (no function)
⑦ Red and green LED (status displays)
⑧ Swivel connector unit with electrical connections ⑩ and ⑫
⑨ Micro USB port, behind the black rubber plate ('Aux interface' connection for configuration with PC)
⑩ Connection "Power/Synchronization output" 5-pin, M12 outlet
⑪ Marking for the position of the light emission level
⑫ Ethernet connection, 4-pin M12 port
⑬ Area in which no reflective surfaces are allowed for mounted devices
⑭ Bearing marking to support alignment (90° axis)
⑮ 270° aperture angle (visual range)

⚠ CAUTION

Laser beam

The TiM corresponds to laser class 1 (eye-safe).
The laser beam is not visible to the human eye.

Caution – incorrect use can lead to the user being exposed to dangerous radiation.

- ➢ Do not open the screw of the TiM housing.
- ➢ Comply with the latest version of the applicable provisions on laser protection.

Additional information ➜ see *"Technical data Page 3"*.

Status indicators, functions

* Push-button with no function

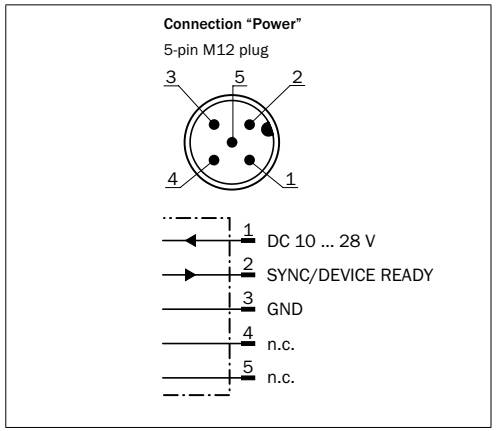
Status displays

LED ⚠ (red)	LED ▶ (green)	Status
–	●	Device ready/monitoring mode
✳	–	Error
–	–	Device without supply voltage

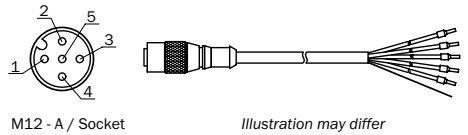
● = illuminated; ✳ = flashing

Pin assignment for swivel connector unit

POWER connection (supply voltage)



Cable no. 6036159 (5 m)

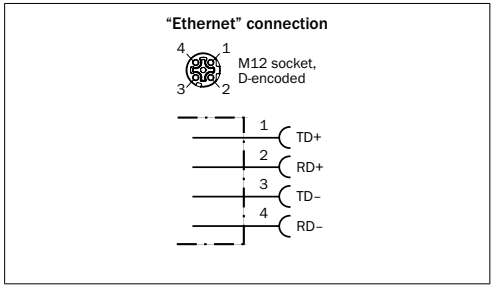


M12 - A / Socket — *Illustration may differ*

Pin	Signal	Function	Wire color
1	24 V	Supply voltage IN (9 ... 28 V)	Brown
2	SYNC/Device Ready	Synchronization output	White
3	GND SYS	Ground	Blue or Yellow
4		Not assigned	
5		Not assigned	

Pin assignment of the 5-pin M12 POWER outlet (A-coded), straight, to the cable and wire colors of the open cable end.

Ethernet connection (6034415)



Function of the synchronization output (SYNC/Device Ready)

The synchronization output works with the following levels:

Function	Level
Device Ready	High
Index signal (15 Hz), corresponds to measurement at 90°	Low peaks
Error	Low

Technical data

Model name	TIM551-2050001 (part no. 1060445) TIM561-2050101 (part no. 1071419)
Scanning range	Radial, aperture angle 270° in 1° steps
Angular resolution	TiM55x: 1° TiM56x: 0.33°
Scanning frequency	15 Hz (15 scans/s)
Response time	Typical 67 ms (2 scans)
Scanning range	0.05 m ... 10 m; typically 8 m at 10% remission
Remission	Typical 4% ... > 1,000 % (reflector)
Physical Minimum object size (cross-section)	190 mm for a scanning range of 8 m, 100 mm for a scanning range of 4 m, 55 mm for a scanning range of 2 m and 10% remission

Model name	TIM551-2050001 (part no. 1060445) TIM561-2050101 (part no. 1071419)
Measurement error (typically)[1]	Statistical (1 s): 20 mm Systematic: ± 60 mm Temperature drift 0.5 mm/K
Band width (scan field flatness)	± 3°
Ambient light immunity	80,000 lx (indirect)
Light source	Laser diode, infrared (λ = 850 nm)
Max. radiation power	1,5 W
Max. pulse duration	5 ns
Device laser class	TiM55x: Laser class 1 according to EN 60825-1: 2007-10[2], eye-safe TiM56x: Laser class 1 according to EN 60825-1: 2014-05[2], eye-safe
Output of measured values	Radial distance, reflectivity value, device and status information, time stamp
Aux interface	USB 2.0 for configuration and measure value outputs (15 Hz), connecting cable max. 3 m.
Ethernet interface	Max. data rate: 10 Mbit and 100 Mbit, cable length limited to max. 100 m
Switching inputs	–
Switching outputs	1 x SYNC/Device Ready (I_a ≤ 100 mA), not electrically isolated from the supply voltage. Short-circuit protected / temperature protected
Electrical connections	1 x 4-pin M12 plug (Ethernet) 1 x 5-pin M12 plug (power) 1 x Micro-USB port, type B (covered)
Optical indicators	2 x LED
Supply voltage	DC 9 ... 28 V, SELV according to IEC 60364-4-41: 2005-12
Power consumption	3 W (with unloaded synchronization output)
Housing	Lower part: Die-cast aluminum, optics hood: Polycarbonate with scratch-proof coating
Weight	Approx. 250 g
Electrical safety	According to EN 60950-1:2011-01
Protection class	III according to EN 61140: 2006-08
Enclosure rating	IP 67 (EN 60529: 1991-10/A2: 2000-02). No specified enclosure rating for opened "Aux interface" connection and/or plugged in USB cable!
EMC	Radiated emission: Residential area according to EN 61000-6-3: 2007-01 Electromagnetic immunity: Industrial environment according to EN 61000-6-1: 2007-10
Vibration resistance	According to EN 60068-2-6: 2008-02
Shock resistance	According to EN 60068-2-27: 2009-05
Ambient temperature	Commissioning/switching on: –10 ... +50 °C Operation: -25 ... +50 °C Storage: -40 ... +75 °C
Temperature change	According to EN 60068-2-14: 2009-07
Damp heat	According to EN 60068-2-30: 2005-12

1) For temperatures >-10 °C; without reflectors
2) Complies with 21 CFR 1040.10:2007-04 except for the tolerance according to Laser Notice No. 50 of June 2007

For further technical specifications, see the *Online data sheet* on the product website (*www.mysick.com/en/tim5xx*)

⚠ WARNING

Risk of potential equalization currents

The TiM is designed to be operated in a system with professional grounding of all connected devices and mounting surfaces to the same ground potential. If this condition is not met, potential equalization currents may through along the cable shields, causing the following hazards:

- Dangerous contact voltage on the metal housing
- Malfunction or destruction of the TiM
- Heating of the cables with possible spontaneous combustion.

➢ See the "*Electrical Installation*" chapter in the 🕮 *Technical Information* (Nr. 8015883) on the product website (*www.mysick.com/en/tim5xx*) for measures for eliminating hazards.

Scope of delivery

- TiM including mounting kit 1 (two straight plates, 2 M3 x 4 mm screws)
- Printed operating instructions in German and English, in other languages, as necessary.
- Other optional accessories (if these have been ordered)

Maintenance and care

The TiM does not contain any components that require maintenance. Maintenance is not necessary to ensure compliance with laser class 1.

➢ If it is dirty, clean the infrared light permeable, black optical hood for optimal measurement/detection performance. Do this carefully using a damp cloth (with a mild cleaning agent).

Sources for obtaining additional information

Additional information about the TiM and its optional accessories can be found in the following places:

Product web page for the TiM5xx (www.mysick.com/en/tim5xx)

- Technical Information (supplementary information on mounting and electrical installation, an overview list, and license texts for open-source software) in German (no. 8018552) and English (no. 8015883).
- These operating instructions in German (no. 8015885), English (no. 8015886), and in other languages if required
- SOPAS configuration software with online help
- Ordering information in the detection and ranging solutions product catalog
- Detailed technical specifications (online data sheet)
- Dimensional drawing and 3D CAD dimension models in various electronic formats
- EC declaration of conformity
- SOPAS configuration software updates

Support is also available from your sales partner: *www.sick.com/worldwide.*

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With regard to the rights holders, the following liability exclusion applies to the **GPL components**: This program is distributed in the hope that it will be of use, but without any warranty; neither is there any implied warranty of marketability or suitability for a particular purpose. For details, see the GNU General Public License.

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List of software licenses and license texts

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The firmware of the TiM is therefore subject to the copyrights listed below.
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The Technical Information document can be downloaded free of charge from the following address: *www.mysick.com/en/tim5xx*.

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